THE BEST OF BOTH WORLDS

SEISMIC TESTING

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In commercial construction the use of preferred materials, ease of construction and improved seismic resilience can readily be achieved by combining aspects of two common construction techniques.

Seismic resilience and floor deflections

We frequently receive enquires from designers and commercial contractors asking how to detail gypsum plasterboard partitions to achieve better seismic resilience and to accommodate floor or beam deflections.

Winstone Wallboards is working with other industry partners, including members of the Association of Wall and Ceiling Industries (AWCI) and the University of Canterbury (UoC), on the development and testing of details aimed at minimising earthquake damage to non-structural elements (NSE) in commercial construction.

Gypsum plasterboard lined partitions can be very stiff once fully taped and plaster stopped. When building floors move relative to each other during an earthquake (called 'inter-storey drift'), partitions that cannot follow the displacement can suffer damage such as broken glass, cracked plaster stopping and even plasterboard sheets fracturing or 'popping off' framing.

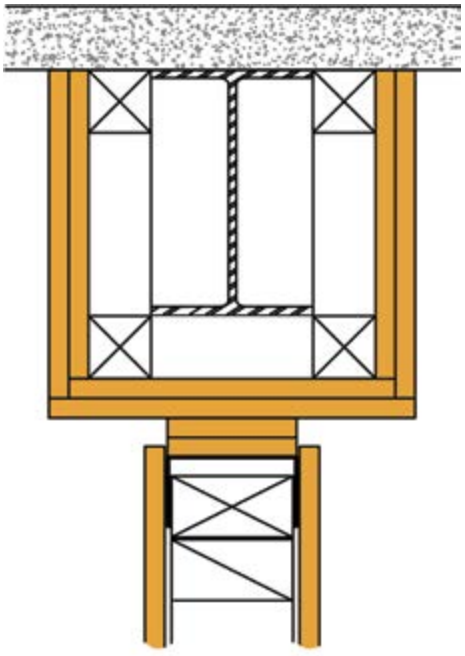
One way to accommodate movement and minimise damage to gypsum plasterboard partitions is to provide regular relief joints, particularly in longer walls, and to disconnect the partition from the slab above by placing framing in deflection tracks.

Steel stud framing

In commercial construction, partitions are often formed using steel studs friction fitted into C-shaped metal top and bottom tracks. To accommodate floor deflections and to allow for thermal expansion of steel studs in fire-rated applications, studs are cut short of full height by a minimum of 15mm for a 3m wall height and this gap is left inside the top track. Linings are fixed to the studs but not to the tracks. This allows lateral and vertical movement of the floor without directly affecting the partition below.

Timber framing

However, when timber framing is specified, designers and contractors often revert back to residential construction techniques and full frames with timber top and bottom plates and nogs are ordered from frame and truss suppliers or constructed and erected on site. This can result in excessive use of materials and difficulties accommodating movement, standing frames, and fitting them into deflection channels. Figure 2 shows an example of common timber framing practice in commercial construction.



ABOVE: Figure 2 - Full timber frames under a steel beam.

Why not steel and timber?

For those who prefer to work with timber, combining the best of both worlds holds promise. Commonly available 92mm x 0.75BMT metal tracks readily accept nominally 90mm timber studs. When using conventional commercial steel framing techniques to install metal top and bottom C-tracks, timber studs can be cut short of full height and friction-fitted. Studs can slide and be located accurately to align with sheet joints. Do not fix linings to the top and bottom tracks so that vertical movement and 'inter-storey drift' can be accommodated. As long as the lining fastener type and length is changed, most non-loadbearing steel frame specifications can be modified to accept timber studs.

Figure 3 shows an example of timber studs in metal tracks. Note the packer above the channel which will be located behind the lining deflection gap to provide backing against the passage of fire.

We hope to be able to communicate more industry progress on the seismic design of non-structural partitions as soon as information becomes available.

Download the 'Gypsum Plasterboard Lined Partitions in Commercial Construction Update' document from gib.co.nz /assets/uploads. For further information call the GIB® Helpline 0800 100 442.

LEFT: Figure 1 - Test specimens under construction at the UoC. **RIGHT TOP AND BOTTOM:** Figure 3 - Partition framing using timber studs in metal tracks.